DOCUMENT RESUME

ED 405 349 TM 026 128

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TITLE Emerging Uses of Computer Technology in Qualitative Research.
PUB DATE Sep 96
NOTE 10p.; Paper presented at the Annual Conference of the Association of Louisiana Evaluators (7th, New Orleans, LA, September 26-27, 1996).
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Computer Literacy; *Computer Oriented Programs; Computer Software; Computer Software Evaluation; *Data Analysis; Educational Technology; *Evaluation Methods; *Qualitative Research; Researchers; *Research Methodology; Technological Advancement; Word Processing

ABSTRACT

The application of computer technology in qualitative research and evaluation ranges from simple word processing to doing sophisticated data sorting and retrieval. How computer software can be used for qualitative research is discussed. Researchers should consider the use of computers in data analysis in light of their own familiarity and comfort with the technology, the types of data to be collected, and the planned analysis. The general types of programs used by qualitative researchers include word processors, word retrievers, text base managers, code-and-retrieve programs, theory builders, and conceptual network builders. In addition to the main functions that specific programs can carry out, the researcher should consider other criteria in evaluating software. The first criterion is the flexibility of the program, and a second, and fundamental criterion, is the degree to which the program is user friendly. Also to be considered is the match with available hardware. In using computers in data analysis, it is necessary to remember that the technology is the servant and not the expert. Technology use is no substitute for researcher competence or clear thinking. The speed and convenience of the technology may lead the researcher to perform inappropriate tasks, or they may cause the researcher to become fixed on a particular approach to the exclusion of approaches that would be beneficial in the analysis. A list of 18 selected data analysis programs and their distributors is included. (Contains seven references.) (SLD)

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EMERGING USES OF COMPUTER TECHNOLOGY IN QUALITATIVE RESEARCH

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A paper presented at the
Seventh Annual Conference
Association of Louisiana Evaluators
New Orleans, LA September 26-27, 1996

TM026128

EMERGING USES OF COMPUTER TECHNOLOGY IN QUALITATIVE RESEARCH

The development and increasing availability of computers and software programs to help record, sort, retrieve, and analyze data is perhaps the greatest recent change in research technology (Bogdan & Biklin, 1992), and the use of computers in research design and analysis continues to be a growing phenomena. While access to mainframe and PC programs has traditionally been used to analyze quantitative data, there is a growing use of this technology in the field of qualitative research. Almost ten years ago, Brent, Scott, and Spencer (1987) reported that over 70 percent of their respondents acknowledged using computers in qualitative studies. With continuing advances in software development and Personal Computer (PC) accessibility, one can surmise that this percentage is now even higher.

The use of qualitative research designs and aspects of qualitative research in program evaluation are also increasing (Fink, 1995). Such evaluation methodologies are often useful when the goals of a program are in the process of being defined or when more quantitative data regarding the validity and reliability of program outcomes are unlikely to be available in time to complete an evaluation report. Qualitative methods are also often employed in program evaluations to compliment and to add emotion, tone, and phenomenological meaning to otherwise purely quantitative data (Fink, 1995).

The application of computer technology in qualitative research and evaluation ranges from simple word processing to doing sophisticated data sorting and retrieval (Tesch, 1990). Researchers are encouraged to consider the use of computers in data analysis in light of their own familiarity and comfort level with technology, the types of data to be collected, and the planned analysis (Miles &

Huberman, 1994). Most word processing programs have indexing or search-and-find features that allow the researcher to quickly locate key words or specific codes. Programs with data base managers can also be helpful in retrieving and sorting data. Software programs specifically designed for data coding, sorting, and retrieving are increasingly available for both IBM (QUALPRO, TAP, and ETHNOGRAPH) and Macintosh (HYPERQUAL) platforms.

General Software Types and Uses

Many software programs are actually combinations of application programs, but it may be helpful to discuss the general types of programs used by qualitative researchers. Miles and Weitzman (1994) have identified the following six categories of software types and functions.

Word Processors

Word processing programs are basically used in the production and revision of text. Whether IBM or Macintosh platform, these programs are useful in recording, transcribing, and editing field notes; for preparing files for coding; and for writing report text. Once information is saved in this format, it is easily retrieved, edited, and revised. Popular programs are Wordperfect, Wordstar, MicrosoftWord, and MacWrite.

Word Retrievers

This type of program is useful in finding all instances of words, phrases, and word/phrase combinations that you are interested in locating. Some have the capability to present words in context, to count the number of selected words in a file, and to create word lists. Examples include Metamorph, Sonar Professional, The Text Collector, and WordCruncher.

Text Base Managers

This type of program will organize text more systematically for efficient search and retrieval. These programs essentially search for and retrieve numerous combinations of words, phrases, coded segments, or memos. Some of them can highly organize the text into specific cases while others are more useful in managing free form text. Examples are askSam, FoliosVIEWS, and ZyINDEX.

Code-and Retrieve Programs

These programs will help you divide text into segments or chunks, attach codes to the chunks, and allow you to find and display all instances of the recorded and coded chunks. Examples are HyperQual, NUDIST, QUALPRO, and The Ethnograph.

Theory Builders

These programs are often researcher developed. In addition to code-and-retrieve systems, they also allow you to make connections between codes, develop new classifications and categories, and to imply a conceptual structure that fits the data. Examples are HyperRESEARCH, and NUDIST.

Conceptual Network Builders

This type of software not only allows you to build and test theory, but also to work with systematically built graphic networks. The researcher can view the variables linked with other variables by specific relationship (looks like, leads to, is a kind of). The networks develop from the data and the concepts and relationships seen among them. Examples include MECA, and SemNet.

Considerations in Software Selection

In addition to the main functions that specific programs can carry out, there are other criteria to be considered regarding all software collection. The first criteria is the flexibility of the program -- does the program only do what it is built for or can

you use it in additional ways to do other types of analysis without too much time and trouble? One should also consider if the program can be customized to create new routines as the needs emerge?

A second, and fundamental criteria, is the degree to which the program is user friendly. Is the time and effort needed to learn the new program justified by the results? Are there adequate supports for learning the program -- in effect, how useful and understandable is the manual, what tutorials and help screens are available, and will anyone respond when you call for technical support?

Other criteria to be considered are the match between your available hardware and that needed to support and run the program; your own level of expertise; and your comfort level with technology in general.

Dangers of Computer Analysis

Although computers and various software programs can be of great aid to the qualitative researcher and evaluator, there are some inherent dangers associated with their use in data analysis. The attitude and assumptions of the researcher toward the use of computers in analysis can dictate how and to what degree of success technology can be used.

In using computers in data analysis, one must first realize that the technology is the servant and not the expert -- it will do only what it is told to do. The computer program will not set up the initial organization of data, determine interpretation, or "create" phenomenological meaning. Data retrieved by code may not show the context of the word or phrase and their is a danger that data will be deconceptualized or reconceptualized in inappropriate contexts. The researcher must always keep in mind that using technology is not a substitute for researcher competence or clear thinking.

Just as with quantitative analysis, the speed and convenience of technology may lead the qualitative researcher or evaluator to perform inappropriate tasks. A program such as TAP will take key words and create codes very easily. This may lead to the development of very convenient but unnecessary codes and categories. In addition, the researcher may be tempted to design inappropriate analyses based on what the computer can do rather than on what is needed and relevant. There is also the danger that the inherent structure used in any particular program can predispose researchers to view, manipulate, or interpret data in specific or different ways. Effective analysis may require the use of two different types of programs in order to broaden and enhance the interpretation of data (Horney & Healey, 1991).

Finally, the programs and processes that are most convenient for the researcher or evaluator may "freeze" his or her thinking which, in turn, may lead to the same types of analysis for all projects; even when a different process would be more appropriate. It is easy for researchers to "stick to what they know" and in so doing, limit the types of analysis used. Qualitative researchers should be open to divergent ways of thinking so that they can attempt to "expand rather than confine understanding" (Bogdan & Biklin, 1992, p. 42).

Conclusion

The use of technology and computers in qualitative research analysis and program evaluation is an ever increasing and fast moving field (Miles & Weitzman, 1994). As new programs continue to emerge that address new aspects of data analysis in improved ways, it is incumbent upon researchers to consider the appropriateness and usefulness of computers in their analysis of data. By understanding the broad range of common functions and unique features of available software programs while at the same time being aware of the dangers of

relying too much on technology for analysis, qualitative researchers can be liberated to make a "truly informed choice of methods" (Tesch, 1990, p.299).

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Tesch, R. (1990). *Qualitative research: Analysis types and software tools.* Bristol, PA: The Falmer Press.

Selected Qualitative Data Analysis Programs and Distributors (Adapted from Miles & Weitzman, 1994)

askSam: P.O. Box 1428, 119 S. Washington St.., Perry, FL 32347 Phone (800) 800-1997; (904) 584-6590. FAX: (904) 584-7481 Tech support: (904) 584-6590

Folio VIEWS: Folio Corporation, 2155 N. Freedom Blvd. Suite 150, Provo, UT 84604 Phone: (800) 543-6546

HyperQual: Raymond V. Padilla, 3327 N. Dakota, Chandler, AZ 85224. Phone: (602) 892-9173*

HyperRESEARCH: Researchware, Inc., 20 Soren St., Randolph, MA 02368-1945. Phone: (617) 961-3909

Inspiration: Inspiration Software, Inc., 2920 W. Dolph Ct., Suite 3, Portland, OR 97219 Phone: (503) 245-9011

MECA: Kathleen Carley, Department of Social and Decision Sciences, Carnegie Mellon University, Pittsburgh, PA 15568. Phone: (412) 268-3225. E-mail: Kathleen Carley% CENTRO.SOAR.CS.CMU. EDU@Carnegie.Bitnet.

MetaDesign: Meta Software Corporation, 125 Cambridge Park Dr., Cambridge, MA 02140. Phone: (617) 576-6920. FAX: (617) 661-2008.

Metamorph: Thunderstone Expansion Programs International, Inc., 11115 Edgewater Dr., Cleveland, OH 44102. Phone: (216) 631-8544. FAX: (216) 281-0828.

NUDIST: Tom and Lyn Richards, Qualitative Solutions and Research Pty Ltd., 2 Research Drive, La Trobe University, Melbourne, Vic. 3083, Australia. Phone: 61-3-479-1311. FAX: 61-3-479-4441. E-mail: nudist@latcs1.lat.oz.au.

Orbis: XYQuest, The Technology Group, Inc., 36 S. Charles St.., Baltimore, MD 21201. Phone: (410) 576-2040 FAX: (410) 576-1968

QCA: Kriss Drass and Charles Ragin, Center for Urban Affairs and Policy Research, Northwestern University, Evanston, IL 60208. Phone: (708) 491-8712. E-mail: kadrass@nevada.edu;cragin@nwu.edu.

QUALPRO: *Impulse* Development Company, 3491-11 Thomasville Rd., Suite 202, Tallahassee, FL 32308, or Bernard Blackman, 2504 Debden, Ct. Tallahassee, FL 32308-3035. Phone: (904) 668-9865. FAX: (904) 668-9866*

SemNet: Dr. Joseph Faletti, SemNet Research Group, 1043 University Ave., San Diego, CA 92103. Phone: (619) 594-4453.

Sonar Professional: Virginia Systems, Inc., 5509 West Bay Ct., Midlothian, VA 23112. Phone: (804) 739-3200

The Ethnograph: Qualis Research Associates, P. O. Box 2070, Amherst, MA 01004. Phone: (413) 256-8835. E-mail: Qualis@mcimail.com.*

The Text Collector: O'Neill Software, P. O. Box 2611, San Francisco, CA 94126. Phone: (415) 398-2255.

WordCruncher: Johnston &Co., 314 E. Carlyle Ave., Alpine, UT 84004. Phone: (801) 756-1111.

ZyINDEX: ZyLAB Corporation, 1100 Lexington Dr., Buffalo Grove, IL 60089. Phone: (800) 544-6339; (708) 459-8000. FAX: (708) 459-8054.

*These programs are also distributed and supported by Qualitative Research Management, 73425 Hilltop Rd., Desert Hot Spring, CA 92240 Phone: (619) 329-7026. In addition, QRM provides consulting and training services for qualitative data analysis.